



# Expansion of Shek Wu Hui Sewage Treatment Works

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Monthly EM&A Report No. 37  
for December 2008

January 2009

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**Report no:** EA01284 R0902

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**Certified by Environmental Team Leader  
Alexi Bhanja**

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# 1 Executive Summary

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The expansion of Shek Wu Hui Sewage Treatment Works (SWHSTW) aims to increase the treatment capacity of the existing SWHSTW to cope with the increasing wastewater flows and loads as a result of the population growth in the catchment area of Fanling/Sheung Shui and the committed extension of sewerage system to unsewered areas. It is considered as a project constituting a material change to an exempted designated project under Schedule 2 of EIAO. Thus, the procedures under the EIAO have been followed and an Environmental Monitoring and Audit (EM&A) Programme has to be carried out. The present report documents the outcomes of the EM&A Works undertaken during December 2008.

## Breaches of Action and Limit Levels

### *Noise*

No non-compliance of Action/Limit level was recorded at any monitoring stations during the reporting month.

### *1-hr and 24-hr TSP*

No non-compliance of Action/Limit Level for 24-hour TSP monitoring was recorded at any monitoring locations during the reporting month. The second of the three 1-hour TSP monitoring readings taken at CAM2a on 24 December 2008, from 13:30 to 14:00 hours, was  $371 \text{ ug/m}^3$ , which exceeds the Action Level of  $340 \text{ ug/m}^3$ . The Event / Action was followed. There was no need to increase monitoring frequency since this was only a single exceedance.

## Complaints Log

During this reporting month, no environmental complaint was received.

## Notifications of Any Summons and Successful Prosecutions

During the reporting month, no notification of summons or successful prosecution was recorded.

## Reporting Changes

Due to power failure at both monitoring stations on 30 December 2008, the monitoring in the reporting month is not completely in line with the original schedule. The monitoring events were then rearranged to meet those specified in the original schedule in order to meet the requirements stipulated in the EM&A Manual.

Parameter	Monitoring Location	Monitoring Dates
24-hr TSP Monitoring	San Po Street Pumping Station (CAM1a)	6 December, 12 December, 18 December, 24 December, 30 December 2008*, <i>3 January 2009</i>
	Sheung Shui Heung Floodwater Pumping Station (CAM2a)	6 December, 12 December, 18 December, 24 December, 30 December 2008*, <i>3 January 2009</i>

**Note:** \* indicates power failure and italics indicate additional monitoring

### Future Key Issues

Variation Orders (VOs) were issued by DSD and required the construction works to extend until January 2009. The construction activities for January 2009 will include excavation, backfilling, landscaping works, FRP cover installation and manhole construction.

## 2 Introduction

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### 2.1 Basic Information

Shek Wu Hui Sewage Treatment Works (SWHSTW) provides treatment to the wastewater generated from Fanling/Sheung Shui areas before discharge it into Mai Po Inner Deep Bay Ramsar Site through River Indus and Shenzhen River, thus helps protecting the water quality of River Indus, Shenzhen River and Mai Po Inner Deep Bay Ramsar Site. The expansion of SWHSTW aims to expand the treatment capacity of the existing SWHSTW to cope with the increasing wastewater flows and loads as a result of the population growth in the catchment area of Fanling/Sheung Shui and the committed extension of sewerage system to unsewered areas.

In accordance with Section 9(2)(g) of the Environmental Impact Assessment Ordinance (EIAO), the SWHSTW is an exempted designated project as the existing SWHSTW has been in operation before the EIAO came into effect on 1 April 1998. However, since the proposed works involve physical expansion and alternation to the existing SWHSTW (hereafter called “the Project”) and may cause adverse environmental impacts if mitigation measures are not in place, it shall be considered as a project constituting a material change to an exempted designated project under Schedule 2 of EIAO. Hence the procedures under the EIAO have been followed. A Project Profile (PP) for direct application of the EP (Application No.DIR-121/2005) was approved by Environmental Protection Department (EPD) in May 2005 and an environmental permit (EP-218/2005) was obtained prior to the commencement of the expansion works.

Drainage Services Department (DSD) awarded the civil contract of the expansion of SWHSTW to Maeda Corporation (Maeda) in September 2005. Maeda appointed Hyder Consulting Limited (HCL) as the Contractor’s Environmental Team (ET) during the construction period. CH2M HILL Hong

Kong Limited (formerly known as CH2M-IDC Hong Kong Limited) is the independent environmental checker (IEC). The construction contract commenced in September 2005 and the total construction period is approximately 36 months. The notified commencement date of work to the Director of EPD is 14 December 2005.

## 2.2 Management Structure and Project Organisation

The Engineer (DSD) is responsible for overseeing construction works and ensuring that they are undertaken by the Contractor (Maeda) in accordance with the specification and other contractual requirements. The Contractor shall report to the Engineer. The ET is employed by the Contractor and is responsible for conducting the EM&A programme. The IEC shall advise the Engineer on the environmental issues related to the Project.

The key personnel contact names and telephone number are summarised in **Table 2-1**. The project organisation is shown in **Appendix 1**.

Party	Position	Name	Telephone Number
Project Proponent - DSD	Project Manager	Ben Yip	2594 7461
	Engineer's Representative	Freddie Tsang	2594 7459
Contractor - Maeda	Construction Engineer	H. Kakegawa	6409 9851
ET - Hyder	ET Leader	Alexi Bhanja	2911 2916
IEC – CH2M HILL	IEC	Y.T. Tang	3105 8686

**Table 2-1 Key Personnel Contact Names and Telephone Number for the Project**

## 2.3 Construction Programme

Construction programme of the Project is attached in **Appendix 2**.

## 2.4 Works Undertaken During the Reporting Month

Works undertaken during the reporting month included:

- Excavation (Portion 1) and backfilling (Portion 1)
- Structural steelwork with FRP covers
- Cable trench construction

## 2.5 Environmental Permits/Licences

The status of environmental permits/licences for the Project is shown below:

Permit/Licence	Application Date	Date of Issue	Ref. No.	Valid Until
Environmental Permit	21/05/05	16/06/06	EP-218/2005	End of Project
Notification was made to EPD pursuant to Section 3(1) of the Air Pollution Control (Construction Dust) Regulation	22/09/05	N/A	N/A	End of Project



Permit/Licence	Application Date	Date of Issue	Ref. No.	Valid Until
(Form NA was submitted)				
Registration as a chemical waste producer	26/09/05	04/11/05	WPN: 5213-624-M2446-06	End of Project
Effluent Discharge Licence	11/11/05	20/05/05	Licence No.: W5/11287/1	19/12/10
Application for Exemption Account for Disposal of Construction Waste	24/12/08	Approved by EPD on 31/12/05	Application No.: RN/00134	23/05/09

**Table 2-2 Status of Permits/Licences for the Project**

## 3 Environmental Status

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### 3.1 Works Undertaken during the Month with Illustrations

The site has been subdivided into different Works Areas/Portions as illustrated in **Appendix 3**. Excavation, backfilling, structural steelwork with FPR covers and cable trench construction were undertaken in Portions 1.

### 3.2 Project Area, Environmental Sensitive Receivers and Monitoring Locations

The site is located at the existing Shek Wu Hui Sewage Treatment Plant, next to Chuk Wan Street. The project area, environmental sensitive receivers and monitoring locations are shown in **Appendix 4**.

## 4 Brief Summary of EM&A Requirements

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### 4.1 Monitoring Parameters

#### 4.1.1 Air Quality

During the construction phase impact monitoring, 1-hour and 24-hour Total Suspended Particulates (TSP) levels should be measured at the selected air monitoring locations in accordance with the EM&A Manual. These two parameters indicate the impacts of construction dust on air quality.

#### 4.1.2 Noise

The construction noise level should be measured in terms of the A-weighted equivalent continuous sound pressure level ( $L_{eq}$ ) for 30 minutes.  $L_{eq(30 \text{ min})}$  is used as the monitoring parameter for the period between 0700

and 1900 hours on normal weekdays. For all other time periods, three consecutive  $L_{eq(5min)}$  are employed for comparison with the Noise Control Ordinance (NCO) criteria. Other noise parameters such as  $L_{10}$  and  $L_{90}$  should also be obtained for reference.

## 4.2 Action and Limit Levels

### 4.2.1 Air Quality

The baseline monitoring results documented in the Baseline Monitoring Report for the Project (our report ref.: EA01284R0012) form the basis for derivation of the Action and Limit Levels for air quality impact monitoring. **Appendix 5** shows the derived Action and Limit Levels for the Project. If the air quality criteria are exceeded due to the Project, the Event/Action Plan summarised in **Table 4-1** should be triggered immediately.

### 4.2.2 Noise

The Action and Limit Levels for construction noise are defined in **Appendix 5**. If valid non-compliance of the criteria occurs, actions in accordance with the Event and Action Plan in **Table 4-2** should be implemented. If construction works are undertaken during the restricted hours, a construction noise permit under NCO shall be obtained by the Contractor.

## 4.3 Event and Action Plans

The Event and Action Plans for air quality and noise monitoring are shown in **Tables 4-1** and **4-2**, below, respectively.

## 4.4 Environmental Mitigation Measures and Requirements

The recommended measures for mitigating air quality, water quality, noise, waste and all other possible environmental impacts due to the construction works have been stated clearly in the EM&A Manual. The details of the measures implemented by the Contractor are shown in **Appendix 6**.

Further to the Action/Limit Level exceedances at both monitoring stations for 1-hour and 24-hour TSP in November 2008, the Contractor was reminded to frequently water and clean the access roads within the site so as to minimize the dust impact. The water spraying record and relevant photos provided by the Contractor were shown in **Appendix 13**.

Event	Action			
	ET	IEC	ER	Contractor
<b>Exceedance of Action Level for Air Quality</b>				
Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify source, investigate the causes of exceedance and propose remedial measures;</li> <li>2. Inform IEC and ER;</li> <li>3. Repeat measurement to confirm finding.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any unacceptable practice;</li> <li>2. Amend working methods if appropriate.</li> </ol>
Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>1. Identify source, investigate the cause of exceedance and propose remedial measures;</li> <li>2. Inform IEC and ER;</li> <li>3. Advise ER on the effectiveness of the proposed remedial measures;</li> <li>4. Repeat measurements to confirm findings;</li> <li>5. Increase monitoring frequency to daily;</li> <li>6. Discuss with IEC and Contractor on remedial actions required;</li> <li>7. If exceedance continues, arrange meeting with IEC and ER;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise the ET on the effectiveness of the proposed remedial measures;</li> <li>5. Supervise Implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit proposals for remedial to ER within 3 working days of notification;</li> <li>2. Implement the agreed proposals;</li> <li>3. Amend proposal if appropriate.</li> </ol>
<b>Exceedance of Limit Level for Air Quality</b>				
Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify source, investigate the causes of exceedance and propose remedial measures;</li> <li>2. Inform IEC, ER, Contractor and EPD;</li> <li>3. Repeat measurement to confirm finding;</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise ER on the effectiveness of</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Amend proposal if appropriate.</li> </ol>

Event	Action			
	ET	IEC	ER	Contractor
	<ol style="list-style-type: none"> <li>4. Increase monitoring frequency to daily;</li> <li>5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.</li> <li>6. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>the proposed remedial measures;</li> <li>5. Supervise implementation of remedial measures.</li> </ol>		
Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>1. Notify IEC, ER, Contractor and EPD;</li> <li>2. Identify source, investigate the cause of exceedance and propose remedial measures;</li> <li>3. Repeat measurement to confirm findings;</li> <li>4. Increase monitoring frequency to daily;</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;</li> <li>6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken;</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET, and Contractor on the potential remedial actions;</li> <li>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise ER accordingly;</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Ensure remedial measures properly implemented;</li> <li>5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Resubmit proposals if problem still not under control;</li> <li>5. Stop the relevant portion of works as determined by ER until the exceedance is abated.</li> </ol>

**Table 4-1 Event/ Action Plan for Air Quality Monitoring**

Event	Action			
	ET	IEC	ER	Contractor
<b>Exceedance of Action Level for Noise</b>	<ol style="list-style-type: none"> <li>1. Notify IEC and ER;</li> <li>2. Carry out investigation;</li> <li>3. Report the results of investigation to the IEC, ER and Contractors;</li> <li>4. Discuss with the Contractor and formulate remedial measures;</li> <li>5. Increase monitoring frequency to check mitigation effectiveness.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the analysed results submitted by the ET;</li> <li>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly;</li> <li>3. Supervise the implementation of remedial measure.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Require Contractor to propose remedial measures for the analysed noise problem;</li> <li>4. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposal to IEC;</li> <li>2. Implement noise mitigation proposals.</li> </ol>
<b>Exceedance of Limit Level for Noise</b>	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC, ER, EPD and Contractor;</li> <li>3. Repeat measurements to confirm findings;</li> <li>4. Increase monitoring frequency to check mitigation effectiveness;</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;</li> <li>6. Inform IEC, ER and EPD the causes and actions taken for the exceedances;</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET, and Contractor on the potential remedial actions;</li> <li>2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly;</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Require Contractor to propose remedial measures for the analysed noise problem;</li> <li>4. Ensure remedial measures properly implemented;</li> <li>5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Resubmit proposals if problem still not under control;</li> <li>5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.</li> </ol>

**Table 4-2 Event/Action Plan for Noise Monitoring**

## 5 Implementation Status of Environmental Protection and Pollution Control/ Mitigation Measures

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The status of the mitigation measures implemented by the Contractor is listed in **Appendix 6**.

## 6 Monitoring Results

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### 6.1 Monitoring Methodology

#### 6.1.1 Air Quality

1-hr and 24-hr TSP monitoring works were undertaken by the ET using high volume samplers (HVS). The sampling procedures followed the standard sampling method as set out in High Volume Method for Total Suspended Particulates, Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the USEPA.

During the sampling, dust laden air was drawn through a HVS fitted with a conditioned, pre-weighted filter paper, at a controlled rate. After sampling for 1 hour and 24 hours, the filter paper with retained particles was collected and returned to the laboratory for drying in a desiccator followed by accurate weighing. Respective 1-hour and 24-hour TSP levels were calculated from the ratio of the mass of particulates retained on the filter paper to the total volume of air sampled.

The HVSs were equipped with an electronic mass flow controller and calibrated against a traceable standard at regular intervals. All equipment, calibration kit and filter papers were clearly labelled.

The sampling procedures and specifications were the same for 1-hour and 24-hour baseline air quality monitoring except the sampling duration. The specifications were as follows:

- 0.6-1.7 m<sup>3</sup>/min (20-60SCFM);
- Equipped with a timing/control device with +/- 5 minutes accuracy for 24 hours operation;
- Installed with elapsed time meter with +/- 2 minutes accuracy for 24 hours operation;
- Capable of providing a minimum exposed area of 406 cm<sup>2</sup> (63in<sup>2</sup>);
- Flow control accuracy: +/- 2.5% deviation over 24-hr sampling period;
- Equipped with a shelter to protect the filter and sampler;
- Incorporated with an electronic mass flow rate controller or other equivalent devices;
- Equipped with a flow recorder for continuous monitoring;
- Provided with a peaked roof inlet;

- Incorporated with a manometer;
- Able to hold and seal the filter paper to the sampler housing at horizontal position;
- Easy to change the filter; and
- Capable of operating continuously for a 24-hour period.

Relevant environmental data including temperature, pressure, weather conditions, elapsed-time meter reading for the start and stop of the sampler, identification and weight of the filter paper, and other special phenomena observed and work progress of the concerned site were also recorded.

Filter papers of size 8"x10" were labelled before sampling. They were inspected clean with no pin holes and conditioned in a humidity-controlled chamber for over 24-hr and be pre-weighed before use for the sampling.

After sampling, the filter papers loaded with dust were kept in a clean and tightly sealed plastic bag, and then returned for reconditioning in the humidity controlled chamber followed by accurate weighing by an electronic balance with a readout down to 0.1 mg. All the collected samples would be kept in a good condition for 6 months before disposal.

The weight of filter paper was measured by a HOKLAS accredited laboratory.

## 6.1.2 Noise

Weatherproof logging sound level meters which comply with the International Electrotechnical Commission Publication 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications were used to measure the construction noise at the designated monitoring locations. Noise parameters of the A-weighted levels  $L_{eq}$ ,  $L_{10}$  and  $L_{90}$  were measured with a sampling period of 5 minutes throughout the monitoring. The average of six consecutive 5-minute readings was used to provide  $L_{eq(30 \text{ minutes})}$  for non-restricted hours. A facade correction of 3dB(A) would be applied to all free field measurements.

During the impact monitoring, information such as date, weather condition, equipment used, measurement results and major noise sources were recorded on the field data record sheet. Noise measurements would not be made in fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed would be checked with a portable wind speed meter capable of measuring wind speed in m/s. All measurements were recorded to the nearest 0.1dB(A).

## 6.2 Name of Laboratory, Types of Equipment Used and Calibration Details

### 6.2.1 Name of Laboratory

Filter papers used for air quality monitoring were sent to ALS Environmental, a HOKLAS accredited laboratory, for weighing. Other sampling and analytical works were conducted by Hyder Consulting Limited, the ET.

### 6.2.2 Types of Equipment Used and Calibration Details

HVS - Model GBM2000H1, manufactured by Anderson Instruments Inc., was used for TSP monitoring. It complies with the USEPA specifications in Appendix B Part 50 - Reference Method for the Determination of Suspended Particulate matter in the Atmosphere (High-Volume Method) of the Code of Federal Regulation dated July 1, 1991. Initial calibration of dust monitoring equipment was conducted upon installation and prior to commissioning. One point flow rate calibration would be carried out every two months. Five-point calibration would be carried out every six months. All the calibration data were converted into standard temperature and pressure condition.

Orific HVS Calibration Kit Serial No: 517N was used for the calibration of HVSs. Calibration of calibration kit would be carried out annually. **Appendix 7** presents the monitoring equipment calibration records.

For noise monitoring, Bruel & Kjaer (B&K) Precision Integrating Sound Level Meters of Type 2238 in compliance with the International Electrotechnical Commission Publication 651: 1979 (Type 1) and 804: 1985 (Type 1) Specifications were used.

Prior to and following each noise measurement, the accuracy of the sound level meter was checked using an acoustic calibrator (B&K Type 4230) generating a known sound pressure level at a known frequency. Measurements were considered as valid only if the calibration level from before and after the noise measurement agree to within 1.0dB. All sound level meters and calibrators would be calibrated annually. **Appendix 7** presents the monitoring equipment calibration records.

**Table 6-1** summarises the types of monitoring and calibration equipment.

Equipment Type	Manufacturer	Model	Serial Number/I.D.
Sound Level Meter	B&K	Type 2236	1774423
Sound Level Calibrator	B&K	Type 4231	1770806
High Volume Sampler	Anderson	GBM 2000 H1	1097
High Volume Sampler	Anderson	GBM 2000 H1	1062
Orific HVS Calibration Kit	Tisch Environmental	N/A	517N

**Table 6-1 Monitoring Equipment**



## 6.3 Parameters Monitored

Parameters monitored are described in Sections 4.1.1 and 4.1.2.

## 6.4 Monitoring Locations

There are two designated air quality monitoring locations identified in the EM&A Manual. Due to the access constraint, alternative monitoring locations were selected and approved by ER, IEC and EPD prior the commencement of monitoring. These alternative locations for air quality monitoring are summarised in **Table 6-2** and shown in **Appendix 4**.

Monitoring Station ID	Name of Premises	Monitoring Location
CAM1a	San Po Street Pumping Station	Ground floor level
CAM2a	Sheung Shui Heung Floodwater Pumping Station	Ground floor level

**Table 6-2 Air Quality Monitoring Locations**

There are two designated noise monitoring locations identified in the EM&A Manual and their locations are described below and shown in **Appendix 4**.

Monitoring Station ID	Name of Premises	Monitoring Location
NM1	Wai Loi Tsuen	1.2m above ground
NM2	Temporary Domestic Structure	1.2m above ground

**Table 6-3 Noise Monitoring Locations**

## 6.5 Monitoring Date, Time, Frequency and Duration, Weather Condition and Other Factors

Monitoring frequency for 1-hr TSP and 24-hr TSP is 3 times every 6 days and once every 6 days, respectively. One set of noise measurements will be conducted between 0700 and 1900 on normal weekdays at each monitoring station on a weekly basis, when noise-generating activities are underway. Monitoring date, time and duration for noise and air quality monitoring and all other factors related to the monitoring result, such as weather condition, are listed in the following tables.

## 6.6 Results and Graphical Plots of Monitoring Parameters

Air quality monitoring results of 1-hour and 24-hour TSP levels are summarised in **Table 6-6** and detailed in **Appendix 8**. Graphical plots of the monitoring results are also provided in **Appendix 8**.

Station	Date	Time	Duration	Weather
<b>1-hr TSP</b>				
CAM1a	6 December 2008	0910-1210	3 X 1 hour	Sunny
	12 December 2008	1300-1600	3 X 1 hour	Sunny
	18 December 2008	0905-1205	3 X 1 hour	Sunny
	24 December 2008	0810-0910, 1310-1510	3 X 1 hour	Fine
	30 December 2008	1210-1510	3 X 1 hour	Cloudy
CAM2a	6 December 2008	0928-1228	3 X 1 hour	Sunny
	12 December 2008	1310-1610	3 X 1 hour	Sunny
	18 December 2008	0915-1215	3 X 1 hour	Sunny
	24 December 2008	0800-0900, 1330-1530	3 X 1 hour	Fine
	30 December 2008	1200-1500	3 X 1 hour	Cloudy
<b>24-hr TSP</b>				
CAM1a	6 December 2008	1210-1210	24 hours	Sunny
	12 December 2008	1600-1600	24 hours	Sunny
	18 December 2008	1205-1205	24 hours	Sunny
	24 December 2008	1510-1510	24 hours	Fine
	30 December 2008*	--	--	--
	<i>3 January 2009</i>	1400-1400	24 hours	Sunny
CAM2a	6 December 2008	1228-1228	24 hours	Sunny
	12 December 2008	1610-1610	24 hours	Sunny
	18 December 2008	1215-1215	24 hours	Sunny
	24 December 2008	1500-1530	24 hours	Fine
	30 December 2008*	--	--	--
	<i>3 January 2009</i>	1410:1410	24 hours	Sunny

**Note:** \* indicates power failure and *italics* indicate additional monitoring

**Table 6-4 Schedule for Air Quality Monitoring**

Station	Date	Time	Duration	Weather
NM1	6 December 2008	1031-1101	30 minutes	Sunny
	12 December 2008	1315-1345	30 minutes	Sunny
	18 December 2008	0920-0950	30 minutes	Sunny
	24 December 2008	1335-1405	30 minutes	Fine
	30 December 2008	1215-1245	30 minutes	Cloudy
NM2	6 December 2008	0930-1000	30 minutes	Sunny
	12 December 2008	1420-1450	30 minutes	Sunny
	18 December 2008	1020-1050	30 minutes	Sunny
	24 December 2008	1440-1510	30 minutes	Fine
	30 December 2008	1320-1350	30 minutes	Cloudy

**Table 6-5 Schedule for Noise Monitoring**

Station	Date	Measured Level ( $\mu\text{g}/\text{m}^3$ )		Action/Limit Level ( $\mu\text{g}/\text{m}^3$ )	
		1-hr TSP	24-hr TSP	1-hr TSP	24-hr TSP
CAM1a	6 December 2008	333.9	122.5	342.7 / 500	203.3 / 260
		218.5			
		229.3			
	12 December 2008	154.4	158.3		
		115.0			
		100.0			
	18 December 2008	157.0	139.4		
		169.3			
		118.5			
	24 December 2008	175.4	165.1		
		261.6			
		169.6			
	30 December 2008	125.5	--*		
129.3					
120.2					
3 January 2009	N/A	61.9			
CAM2a	6 December 2008	193.9	128.5	340.2 / 500	201.6 / 260
		162.7			
		161.0			
	12 December 2008	142.2	144.2		
		101.1			

Station	Date	Measured Level ( $\mu\text{g}/\text{m}^3$ )		Action/Limit Level ( $\mu\text{g}/\text{m}^3$ )	
		1-hr TSP	24-hr TSP	1-hr TSP	24-hr TSP
		84.6			
	18 December 2008	182.4	22.4		
		218.5			
		92.0			
	24 December 2008	177.5	178.1		
		<b>371.3</b>			
		290.1			
	30 December 2008	129.0	--*		
		115.4			
		111.2			
	3 January 2009	NA	149.9		

**Note:** Shading indicates exceedance of Action Level. **Bold** indicates exceedance of Limit Level.  
\* indicates power failure and *italics* indicate additional monitoring

**Table 6-6 Air Quality Monitoring Results**

Noise monitoring results are summarised in **Table 6-7** and detailed in **Appendix 8**. Graphical plots of the monitoring results are also provided in **Appendix 8**. As all monitoring was conducted at free field condition, a facade correction of 3dB(A) was applied to each of the noise measurements.

Station	Date	Measured Noise Level, dB(A)			Limit Level for $L_{\text{eq}}(30 \text{ min})$ , dB(A)
		$L_{\text{eq}}(30 \text{ min})$	$L_{10}(30 \text{ min})$	$L_{90}(30 \text{ min})$	
NM1	6 December 2008	63.5	66.9	59.3	75
	12 December 2008	63.3	65.4	61.3	
	18 December 2008	61.3	64.2	58.3	
	24 December 2008	65.6	68.4	62.3	
	30 December 2008	63.6	66.0	60.7	
NM2	6 December 2008	60.6	63.9	57.7	
	12 December 2008	59.0	61.7	57.0	
	18 December 2008	55.7	58.2	52.1	
	24 December 2008	60.5	63.3	57.7	
	30 December 2008	60.7	63.7	58.0	

**Note:** Shading indicates exceedance of Limit Level.  
A facade correction of 3dB(A) was applied to each of noise measurement.

**Table 6-7 Noise Monitoring Results**

## 6.7 Factors That Might Affect the Monitoring Results

Dust from other sources such as roads with the movement of heavy vehicles in the vicinity of the monitoring stations would affect the air quality monitoring results.

## 6.8 QA/QC Results and Detection Limit

The quality assurance (QA) / quality control (QC) results and detection limit are shown in **Appendix 9**.

# 7 Non-compliance, Complaints, Notifications of Summons and Successful Prosecutions

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## 7.1 Non-compliance of Action and Limit Levels

No non-compliance of Action or Limit Level was recorded for noise monitoring.

No non-compliance of Action/Limit Level for 24-hour TSP monitoring was recorded at any monitoring locations during the reporting month. The second of the three 1-hour TSP monitoring readings taken at CAM2a on 24 December 2008 from 13:30 to 14:00 was  $371 \text{ ug/m}^3$ , which exceeds the Action Level of  $340 \text{ ug/m}^3$ .

The detail in investigation for the exceedances will be described in Section 7.4.

## 7.2 Complaints Received

In case of an environmental complaint received, all related parties should follow the complaints response procedures specified in the EM&A Manual.

During this reporting month, no environmental complaint was received. Cumulative number of environmental complaint is shown in **Appendix 10**.

## 7.3 Notifications of Summons and Successful Prosecutions

No notification of summons or successful prosecution was recorded during the reporting month. The cumulative number of notifications of summons and successful prosecutions are shown in **Appendix 10**.

## 7.4 Review of the Reasons and Implications of Non-compliance, Complaints, Summons and Prosecutions

### 7.4.1 Non-compliance of Acton/Limit Level

No non-compliance for noise monitoring was recorded during the reporting period.

No non-compliance of Action/Limit Level for 24-hour TSP monitoring was recorded at any monitoring locations during the reporting month.

The second of the three 1-hour TSP monitoring readings taken at CAM2a on 24 December 2008 from 13:30 to 14:00 was 371 ug/m<sup>3</sup>, which exceeds the Action Level of 340 ug/m<sup>3</sup>. As advised by the Contractor, the site activities carried out on 24 December 2008 included:

- Installation of S.S. support for FRP cover
- Installation of FRP Catladder
- Pouring concrete of manhole base slab
- Painting internal wall of structure
- General cleaning for handing over

These activities conducted between 13:30 and 14:00 on 24 December 2008 are therefore unlikely to have caused significant fugitive dust impact. During monitoring between 13:30 and 14:00, it was observed that there were a large number of truck movements along Po Wan Road, which is adjacent to CAM2a, and this is the ET Leader's account for the high dust reading.

The first 1-hour TSP reading, from 08:00 to 09:00 was 176 ug/m<sup>3</sup>, and the third reading, from 14:30 to 15:00 was 290 ug/m<sup>3</sup>. Both of these readings are below the Action Level and so the second reading was a single exceedance. Moreover, no exceedance was recorded on 30 December 2008.

In accordance with the Event/Action Plan (Table 4-1), the following actions were taken for a single exceedance:

- **Identify source, investigate the causes of exceedance and propose remedial measure** – the ET has concluded that the source of dust was from traffic on Po Wan Road and not related to the project.
- **Inform IEC and ER** – the IEC and ER were informed.
- **Repeat measurement to confirm finding** – a third reading was taken immediately after the exceedance and showed no continuation of the exceedance.

The Event/Action Plan has been followed and it has been concluded that the Action Level exceedance was unlikely to be project-related. Nevertheless, the Contractor has been reminded to frequently water and clean the access road within the site so as to minimize the dust impact. There is no need to increase the TSP monitoring frequency to daily, since

there was only a single exceedance and not two or more consecutive exceedances.

#### 7.4.2 Complaints, Summons and Prosecutions

No complaint, summons and prosecution was recorded during the reporting period.

### 7.5 Site Inspection

Weekly site inspections were carried out on 4, 12, 16, 23 and 30 December 2008. The findings of the site inspections and appropriate mitigation measures were recorded in the site inspection checklists.

The observations risen during the site inspections, corresponding recommendations and rectification status are summarised in **Table 7-1**, below.

There was no EPD inspection carried out in December 2008. The site audit conducted by IEC was carried out on 10 December 2008 and the Contractor has undertaken appropriate actions in response to the IEC's findings.

Inspection Date	Deficiencies	Recommendation	Status	Note / Reminder
Follow-up	Stockpile was observed at No.7 Final Sedimentation tank area.	The Contractor was reminded to provide cover to all dusty materials	Upon the site inspection on 4 December 2008, the open stockpile was removed.	Nil
04-Dec-08	<ol style="list-style-type: none"> <li>Open stockpile at Final Sedimentation Tank was observed.</li> <li>Oil leakage was observed at Final Sedimentation Tank area.</li> <li>General refuse was observed at the back of the boiler room.</li> </ol>	<ol style="list-style-type: none"> <li>The Contractor was reminded to cover the stockpile properly.</li> <li>The Contractor was reminded to clean it out by sand and treated as chemical waste.</li> <li>The Contractor was reminded to clean it up.</li> </ol>	<ol style="list-style-type: none"> <li>At the time of site inspection, the deficiency was immediately rectified by the Contractor</li> <li>Upon the site inspection on 12 December 2008, the oil was cleaned up.</li> <li>Upon the site inspection on 12 December 2008, the general refuse at the back of the boiler room was removed.</li> </ol>	Nil
12-Dec -08	General refuse was observed at sludge area.	The Contractor was reminded to remove the refuse regularly	Upon the site inspection on 16 December 2008, the general refuse was removed.	Nil
16-Dec-08	Dry stockpile was observed at No.7 Final Sedimentation Tank area	The Contractor was reminded to cover the stockpile properly	Upon the site inspection on 23 December 2008, the dry stockpile was still found at No. 7 Final Sedimentation Tank Area. The Contractor was reminded to cover the stockpile properly.	Nil
23-Dec -08	Outstanding issue on 16 December 2008: Dry stockpile was observed at No.7 Final Sedimentation Tank area	The Contractor was reminded to cover the stockpile properly	Upon the site inspection on 30 December 2008, the dry stockpile at No.7 Sedimentation tank was properly covered.	Nil
30-Dec-08	Accumulation of general refuse was observed at No.7 sedimentation tank.	The Contractor was reminded to remove the refuse as soon as possible	N/A	Nil

**Table 7-1 Summary of Site Inspections and Recommendations**



## 8 Waste Management Status

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According to the information provided by the Contractor, the following waste materials were generated during the reporting month:

- Inert C&D materials – 52.0 m<sup>3</sup>, and
- General Refuse – 26.0 m<sup>3</sup>.

C&D materials were disposed of at Tuen Mun Area 38 Public Fill. General refuse was collected and disposed of at NENT Landfill properly. No chemical waste was produced during the reporting month. Trip ticket system was implemented and disposal records were in order on site. The Waste Management Plan was followed.

## 9 Future Key Issues

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Variation Orders (VOs) were issued by DSD and required the construction works to extend until January 2009. The construction activities for the coming months will be:

- Excavation (Portion 1) and backfilling (Portion 1)
- FRP covers
- Landscaping Works
- Manhole Construction

## 10 Comments, Recommendations and Conclusions

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EM&A works have been undertaken in December 2008 for the Project based on the requirements in the EM&A Manual.

All monitoring equipments have been calibrated and all monitoring protocols have been carried out properly according to the EM&A Manual.

No non-compliance of Action/Limit level for noise monitoring was recorded at any monitoring stations during the reporting month.

No non-compliance of Action/Limit Level for 24-hour monitoring was recorded at any monitoring locations during the reporting month. The second of the three 1-hour TSP monitoring readings taken at CAM2a on 24 December 2008, from 13:30 to 14:00 hours, was 371 ug/m<sup>3</sup>, which exceeds the Action Level of 340 ug/m<sup>3</sup>. The Event / Action was followed. There was no need to increase monitoring frequency since this was only a single exceedance.

No complaint, notification of summons or successful prosecution was recorded during the reporting month.

Five weekly site inspections were carried out during the reporting month. In response to the observations raised by ET, the Contractor has undertaken follow-up actions to rectify the condition.

# Appendix 1

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## Project Team Organization

# Appendix 2

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## Construction Programme

# Appendix 3

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## Location of Works

# Appendix 4

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## Project Area, Environmental Sensitive Receivers and Monitoring Locations

# Appendix 5

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## Action and Limit Levels

# Appendix 6

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## Environmental Requirements and Implementation Status

# Appendix 7

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## Calibration Records



# Appendix 8

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## Monitoring Results and Graphical Plots

# Appendix 9

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## QA/QC Results and Detection Limit

# Appendix 10

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## Cumulative Statistics of Complaint, Notification of Summons and Successful Prosecution

# Appendix 11

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## Upcoming EM&A Schedule

# Appendix 12

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## Incident Report of Non-Compliance on 24 December 2008

# Appendix 13

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Water Spraying Record and relevant photos taken in  
December 2008